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Agricultural Memorandum No 421 Dr M Hough

Maize Silage Map of England and Wales

Since the map showing areas suitable for grain maize was produced (Ag. Memo 346) several requests have been received for a similar map for maize silage.

The Method

The map is based on accumulated temperatures above 10°C. Although this approach only provides an approximate development - weather relationship, it seems to work acceptably in England where temperatures are considerably below the optimum for maize.

The criterion used to construct the map was that the grain should mature as far as the milky ripe stage. This corresponds with the whole plant dry matter content reaching approximately 24%. Russian work on early maize hybrids similar to INRA 200 suggests that an accumulated temperature above 10°C of 628°C days is required from sowing to milky ripeness. Assuming that the frequency distribution of growing season (May to October) accumulated temperatures is normal then a value of accumulated temperature can be found for which there is only a 10% chance that 628°C days will not be reached. Since the standard deviation (in time) of accumulated temperature is about 80°C days, then the required critical value is 728°C days. This means that a place with a mean growing season accumulated temperature above 10°C of more than 728°C days, has less than 10% chance of failure to mature maize to the milk ripe stage, provided that past climate is a reliable guide to the future.

Most of south and east England (except hills over 400 ft) is above the limit of 728°C days, but a large area in the midlands is only a little below. Ag. Memo 411 suggests that the mean air temperature in a well sheltered field (ie a field in which the wind speed is reduced and sunshine not diminished) may be 0.5°C more than an unsheltered site. Such a temperature increase could provide an extra 50°C days between May and October. Therefore a sheltered site in an area which otherwise received 678°C days should still mature grain to the milk ripe stage for 9 years out of 10; this should be especially true for fields with a southern aspect. This extra area is also shown on the map.

Possibilities for Silage Maize

Provided high ground (ie above about 400 ft) is avoided, all counties south of a line from Suffolk to Gloucester appear suitable. South Worcester and Warwick and also the southern part of Norfolk are included in the suitable areas as well. Another favourable area is central Cheshire.

The northern limit for well sheltered fields either follows low lying river valleys, or in the west, coastal areas favoured by mild weather in spring. Thus central Anglesey, the North Wales coastal fringe, the Wirral and the west coast of Lancashire as far north as Preston are included (the height limit being probably 250 ft in the northern areas). The Trent valley allows the possible growing area to extend into Yorkshire, but much of the Central Midlands and north Lincolnshire seems to be just too cool for success, the height above sea level again being an important factor. The Severn and Avon valleys are also suitable areas. In South Wales, the coastal strip from Glamorgan to Pembroke is included.

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No account is taken of soil factors in drawing the map which at best is intended to be no more than a guide. Also it is based on air temperature records between 1950 and 1970 and if the future summer weather is cooler than these years then the area suitable for maize will decrease considerably.

Any comments or criticisms should be sent direct to the author.

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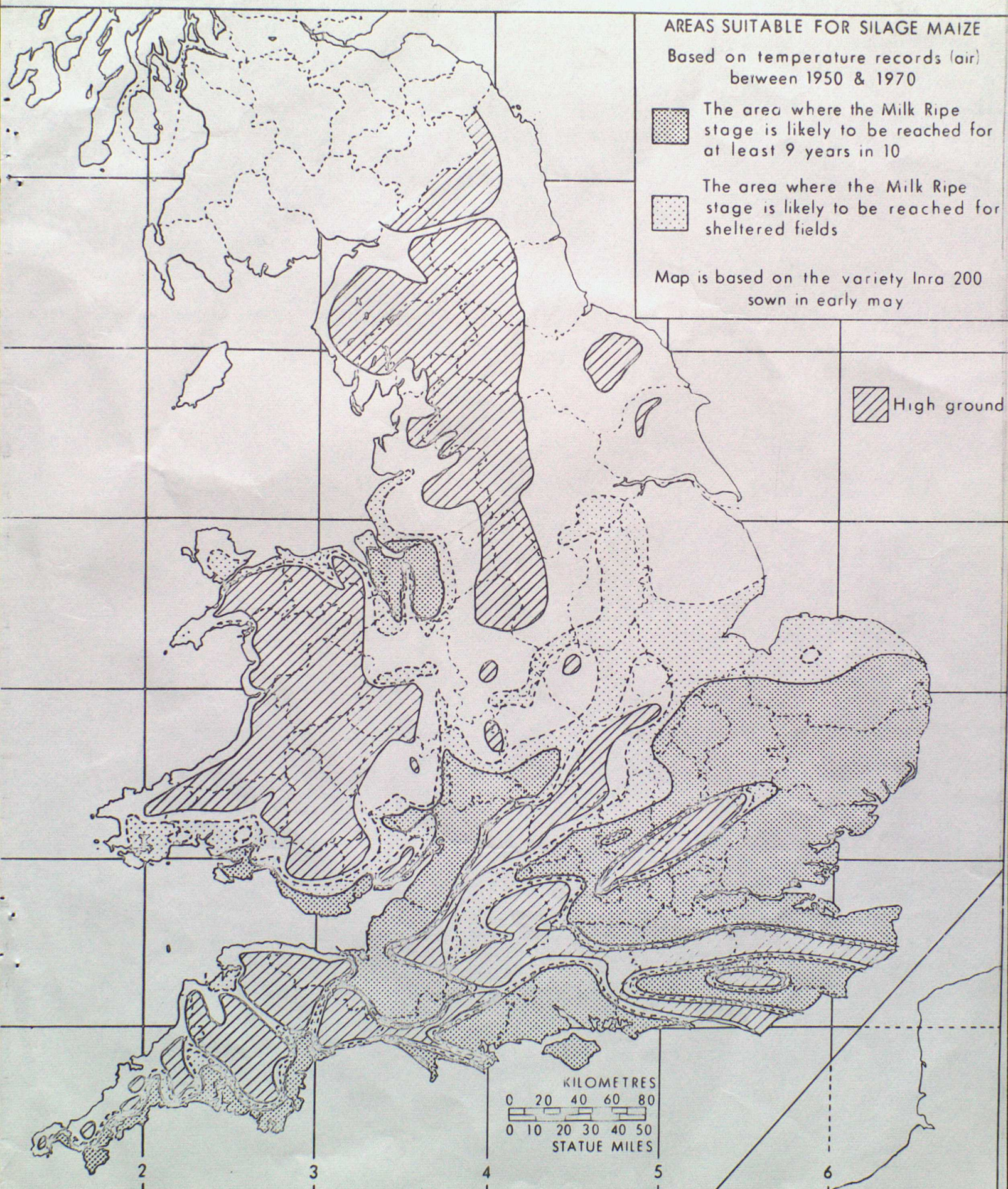
AREAS SUITABLE FOR SILAGE MAIZE
Based on temperature records (air) between 1950 & 1970
The area where the Milk Ripe stage is likely to be reached for at least 9 years in 10
The area where the Milk Ripe stage is likely to be reached for sheltered fields
Map is based on the variety Inra 200 sown in early may
High ground
KILOMETRES
0 20 40 60 80
0 10 20 30 40 50
STATUE MILES
2
3
4
5
6